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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

GOLIGHTLY, ERIC WAYNE

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

03/19/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/553,828	Applicant(s) HASEBE ET AL.	
	Examiner Eric Golightly	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2008 and 24 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>24 February 2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicants' reply filed 12/16/2008 is acknowledged. Claims 1-7 are pending.

Claim Rejections - 35 USC § 112

2. As noted in applicants' reply (remarks at page 4, paragraph beginning "Next"), the previous Office action, a non-final action, appeared to possibly indicate rejections of claims under 35 USC 112, second paragraph. The indication of these rejections was unintentional. None of the claims were rejected under 35 USC 112, second paragraph, in the previous Office action nor are they so rejected in this Office action.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicants are advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-3, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP4-72727 known hereafter as JP'727 in view of Ye et al. (US Patent 5,817,534 known hereafter as '534) and in further view of Yieh et al. (US Patent 6,352,591 known hereafter as '591).

For Claims 1, 5 and 6 JP'727 teaches cleaning an apparatus including a treatment vessel having thereon quartz structures (abstract) by supplying HF gas or NH₃ gas into the treatment vessel (abstract). JP'727 does not explicitly teach that HF gas and NH₃ gas are supplied as a mixed gas or the cleaning time period. Since use of both HF gas and NH₃ gas are disclosed, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use a single mixed gas of HF gas and NH₃ gas with a reasonable expectation of success. MPEP 2144.06(I). '534 teaches a method of cleaning a plasma reactor (abstract) and discloses that it is desired

to speed up the cleaning process to minimize the time required to clean the reactor interior (col. 5 lines 1-15). Therefore, it would have been obvious to one of ordinary skill in the art to minimize the time period up to the minimum time to clean the apparatus in order to increase throughput and minimize the downturn of the apparatus. Minimizing the time period reads on restraining damage to the quartz in view of the corrosive properties of HF gas and NH₃ gas.

JP'727 and '534 do not explicitly teach performing the cleaning method to clean a vessel having therein quartz structures that are exposed to a SiO₂, AsSG or BSG film deposited by means of TEOS. '591 teaches a method of processing semiconductor wafers (abstract) and discloses AsSG and BSG films deposited by means of TEOS (col. 47, lines 19-54). It is noted that '591 discloses vacuum chamber treatment with ammonia and HF vapor (col. 60, lines 1-14). The skilled artisan would have found it obvious to treat structures that are exposed to SiO₂, AsSG and BSG films as per the '591 teaching with the method as per the JP'727/'534 teachings with a reasonable expectation of success since these films are known in the art. It is noted that the recited means for depositing the films, i.e., TEOS, although disclosed in the art of record, does not provide a patentable distinction. See MPEP 2113.

For Claim 2 JP'727, '534 and '591 disclose using a chamber temperature of 300°C ('591 at col. 45 line 66 to col. 46, line 2) during the cleaning step.

For Claim 3 JP'727, '534 and '591 disclose using a pressure of 760 torr during the cleaning ('591 at col. 41, lines 41-44) in one embodiment, but do not explicitly teach this pressure with a temperature range of 100°C to 300°C in this embodiment.

However, JP'727, '534 and '591 disclose another embodiment using a chamber temperature of 300°C ('591 at col. 45 line 66 to col. 46, line 2) during the cleaning step. Since both the claimed temperature and claimed pressure ranges are disclosed, it would have been obvious for the skilled artisan to use a combination of the claimed pressure and temperature ranges during cleaning with a reasonable expectation of success.

7. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'727 (JP4-72727) in view of '534 (US Patent 5,817,534), '591 (US Patent 6,352,591) and '381 (JP 08-195381) and further in view of Goto et al. (US Patent 6,880,561 known hereafter as '561).

JP'727, '534 and '591 disclose using HF and NH₃ to clean but do not explicitly teach the ratio of HF to NH₃. '381 teaches controlling the flow rate of HF and NH₃ controls the etch rate (paragraphs 22-24); therefore, the relative amounts of HF and NH₃ are result effective. It is noted that '381 teaches etching a film on a substrate rather than a chamber surface, but '561 teaches cleaning a processes chamber wall where the cleaning conditions have been determined by experimenting with substrates (col. 5 lines 31-36). The ratio of HF to NH₃ controls the etch rate during the cleaning processes. Thus, it would have been obvious to one of ordinary skill in the art to apply the technique of controlling ratio of HF to NH₃ as taught in '381, to improve the cleaning method taught in JP'727/'534/'591/'561 for the predictable result of cleaning the heat treatment apparatus.

Response to Amendment

8. The declaration under 37 CFR 1.132 filed 5/15/2008 is insufficient to overcome the rejection of claims 1-7 based upon the art of record under 35 USC § 103 as set forth in the last Office action because the facts presented are not germane to the rejection at issue. It include(s) statements which amount to an affirmation that the claimed subject matter functions as it was intended to function. This is not relevant to the issue of nonobviousness of the claimed subject matter and provides no objective evidence thereof. See MPEP § 716.

Response to Arguments

9. Applicants' arguments filed 12/16/2008 have been fully considered but they are not persuasive.

Applicants' argument that the purpose of the declaration filed on 5/15/2008 was to establish criticality of applicants' stated range of cleaning times (remarks at page 5, second paragraph) is unpersuasive. As to the criticality of the cleaning time being limited to protect the quartz structure, it is noted that time is a result effective variable and it is known in the art to minimize time required to clean (See '534 col. 5 lines 1-15) in order to, for example, inhibit excess damage from corrosion. See JP 7315872 to Kenmochi et al. which teaches a method of processing the surface of a quartz glass (abstract) including treatment with a mixture comprising ammonium fluoride and

hydrogen fluoride, and discloses that the mixture corrodes the surface of the quartz (id.).

Applicants' assertion that the minimization of exposure time is critical due to the expensive and vulnerable equipment involved (remarks at page 5, second paragraph) in fact supports the position that claimed range would have been obvious, i.e., the minimization of time cannot be considered nonobvious since the skilled artisan would have found it obvious to minimize the exposure of expensive equipment by minimizing the cleaning period. That is, assuming *arguendo* that applicants' are correct that the applied art does not teach or suggest a relationship between a *particular* cleaning time range and damage to expensive equipment (remarks at page 6, first paragraph), the skilled artisan would nevertheless have found it obvious to optimize the cleaning time range through routine experimentation in order to inhibit the risk of damage to the expensive equipment in view of the known corrosive properties of HF gas and NH₃ gas. Applicant is reminded of the disclosure of JP 7315872 to Kenmochi et al. as discussed in the previous paragraph. Further, as noted above in the section "Claim Rejections - 35 USC § 103", the skilled artisan would have found it obvious to minimize cleaning time in order to increase throughput and minimize downtime of the equipment.

Regarding applicants' allegation that previous Office action incorrectly concluded that it would have been obvious to combine two disclosed gases into a single mixed gas (remarks at page 1 and 2, footnote 1, apparently referencing the previous Office action at page 4, first paragraph), applicants are reminded that it is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the

same purpose, in order to form a third composition to be used for the very same purpose. The idea of combining them flows logically from their having been individually taught in the prior art. MPEP 2144.06(I).

Applicants' assertion that applicants' claimed method results in cost savings via prolonging the life of quartz components (remarks at page 6, first paragraph) goes to the perceived benefits of the claimed method, but is not germane to the rejections.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Golightly whose telephone number is (571) 270-

3715. The examiner can normally be reached on Monday to Thursday, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on (571) 272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EWG
/Michael Kornakov/
Supervisory Patent Examiner, Art Unit 1792